File NorCal
Compact:
Phase I –
Vasten Site
27.5 Acres

NorCal Engineering

SOILS AND GEOTECHNICAL CONSULTANTS
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March 18, 1998 Project Number 5936-96

Boeing Realty Corporation
4060 Lakewood Boulevard, 6th Floor
Long Beach, California 90808-1700

Attn: Mr. Steve Bisset

RE: **Supplemental Compaction Testing of Fill Soils in Phase I Area** - Existing Boeing Property - Located at the Southwest Corner of 190th Street and Normandie Avenue, in the City of Los Angeles, California

Dear Mr. Bisset:

Pursuant to your request, this firm has performed supplemental compaction testing of fill soils placed recently at the subject site. These fill soils were installed without observation and testing by NorCal Engineering at the time of placement. A previous compaction report by this firm dated December 11, 1997, detailed compaction testing of other sections within the Phase I area which were observed and tested by this firm. The following report details the current field testing operations, laboratory testing and discusses the results of our work.

Field Investigation

The purpose of the investigation was to explore the subsurface conditions in selected areas to determine relative compaction densities of the previously placed fill soils which were not observed and tested by this firm. Locations of the subsurface explorations and the areas investigated are shown on the attached Site Plan which also includes previous compaction test locations. Areas tested were plotted approximately by client prior to our arrival on site.

Tests were taken in specific areas in order to provide at least one compaction test for each 1,000 cubic yards of soils placed in that area. Quantities of fill were based on the *As-Built Demolition Plan* by Tait & Associates, dated October 21, 1997. Tests were taken at random intervals throughout the fill soils

Field and Laboratory Test Methods

Relatively undisturbed samples of the subsurface soils were obtained in the field to perform laboratory testing and analysis to determine in-place moisture/densities. These undisturbed samples consisted of one inch rings with inside diameter of 2.5 inches. Random bulk bag samples were obtained from the trenches for maximum density tests. Test results are included in Appendix A.

A. Maximum density tests (ASTM: D-1557-91) were performed on typical samples of the upper soils. Results of these tests are shown on Table I.

B. The field moisture content (ASTM:D 2216) and the dry densities of the ring samples were determined in the laboratory. This data is listed in Table II.

Test Results

A total of 41 test excavations were placed at the site to depths ranging from 3 to 10 feet below existing grades. Excavations were generally stopped when native soils or subsurface concrete slabs were encountered. A total of 51 samples were taken from the field to our laboratory and subjected to the analyses listed above.

Test results are given in Tables I and II and reveal that the soils placed are generally dense and moist and have been compacted to at least 90% relative compaction per the referenced ASTM standards in most areas. The backfill areas have been graded to rough grade elevations, only. Two locations were found in which soils tested were less than 90% relative compaction. These tests are identified in Table II as test numbers 7 and 23. Test 7 was located at a depth of 3 feet in Trench 5, easterly of Pit #2 along the abandoned caisson line. Test 23 was located in Trench 19, northerly of Pit #7 at a depth of 3 feet. Test results reveal the soils in these areas to be compacted to 86 and 87% relative compaction.

Conclusions and Recommendations

Based upon our field observations and the included test results, the majority of backfill soils have been compacted to a minimum of 90% relative compaction with near-optimum moisture levels. NorCal Engineering did not verify all bottoms of excavations prior to placement of backfill soils. Some concrete structures still remain in place and were approved by the City of Los Angeles Grading Inspector.

Two areas were found which were slightly below 90% relative compaction. These lower test results could be due to insufficient compaction efforts or slight variations in soil composition which could account for the slightly lower results.

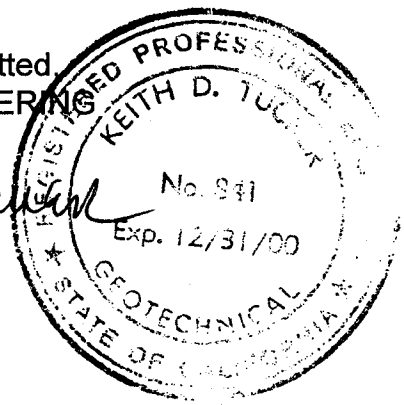
Prior to placement of any additional fill soils the upper 8 inches shall be scarified, moisture conditioned to near-optimum levels and compacted to at least 90% relative compaction.

Closure

The recommendations and conclusions contained in this report are based upon the soil conditions uncovered in our test excavations. No warranty of the soil condition between our excavations is implied. NorCal Engineering should be notified for possible further recommendations if unexpected to unfavorable conditions are encountered during construction phase. It is the responsibility of the owner to ensure that all information within this report is submitted to the Architect and appropriate Engineers for the project.

We appreciate this opportunity to be of service to you. If you have any further questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
NORCAL ENGINEERING



Keith D. Tucker
Project Engineer
R.G.E. 841

Mark A. Burkholder
Project Manager

TABLE I
MAXIMUM DENSITY TESTS
(ASTM: D-1557-91)

Soil Type	Classification	Optimum Moisture	Maximum Dry Density (lbs./cu.ft.)
1	clayey SILT with gravel	12.0	126.5
2	clayey SAND with gravel	10.5	126.5
3	silty CLAY with gravel	12.5	124.0
4	silty CLAY	13.5	119.0
5	silty, sandy CLAY with gravel	12.5	123.0
6	sandy CLAY with gravel	11.5	128.5
7	silty, clayey SAND with gravel	11.5	124.0
8	silty CLAY with base material	10.5	122.5
9	clayey SILT with gravel	13.0	121.5

TABLE II
IN-PLACE MOISTURE/DENSITY TESTS
(ASTM: D-2216)

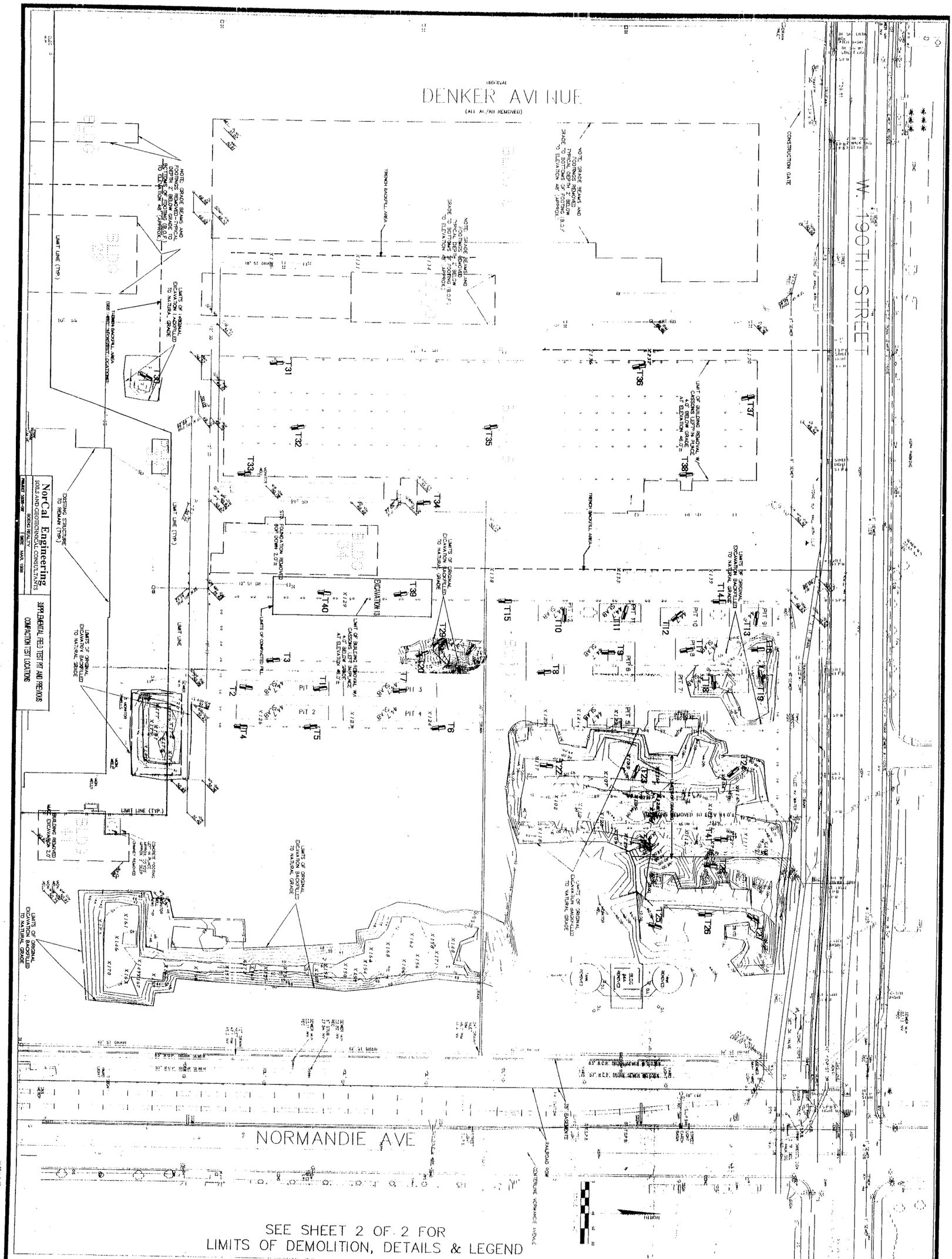
Test/Trench	Depth (ft.)	Moisture Content%	Unit Weight (pcf)	Relative Compaction%	Soil Type
1/1	1.0-1.5	9.6	119.7	95	1
2/1	3.0-3.5	11.2	116.9	92	2
3/2	2.0-2.5	8.6	122.8	94	2
4/2	4.0-4.5	8.0	121.3	93	2
5/3	2.5-3.0	10.1	113.5	92	3
6/4	3.0-3.5	13.3	113.9	92	3
7/5	3.0-3.5	7.4	102.4	86	4
8/6	1.5-2.0	17.6	113.9	93	5
9/7	2.5-3.0	12.7	125.1	95	1
10/8	1.0-1.5	15.8	121.8	96	1
11/8	3.0-3.5	15.2	124.1	95	2
12/9	2.0-2.5	15.5	121.2	96	1
13/10	3.0-3.5	14.9	106.8	90	4
14/11	2.0-2.5	11.9	114.9	93	5
15/12	3.0-3.5	10.6	123.9	96	6
16/13	3.5-.4.0	17.1	120.4	95	1
17/14	2.0-2.5	17.6	119.0	94	1
18/15	2.0-2.5	18.1	117.7	95	3
19/16	2.0-2.5	15.3	118.8	92	6
20/17	3.0-3.5	14.3	119.0	91	2

TABLE II (CONT.)

Test/Trench	Depth (ft.)	Moisture Content%	Unit Weight (pcf)	Relative Compaction%	Soil Type
21/18	2.5-3.0	11.5	120.2	92	2
22/19	2.0-2.5	9.8	113.8	92	7
23/19	3.0-3.5	8.2	106.3	87	8
24/20	3.0-3.5	19.7	114.5	92	3
25/20	2.0-2.5	15.6	115.1	91	1
26/21	2.5-3.0	14.7	120.3	95	1
27/21	4.0-4.5	14.5	118.8	92	6
28/22	2.0-2.5	11.9	126.0	96	2
29/23	1.5-2.0	13.8	121.3	94	6
30/24	3.5-4.0	11.3	124.9	95	2
31/25	2.0-2.5	11.4	128.4	98	2
32/25	5.0-5.5	10.2	117.1	93	1
33/26	1.5-2.0	16.6	117.4	93	1
34/27	2.5-3.0	14.6	123.0	94	2
35/28	2.0-2.5	18.1	120.2	94	6
36/28	6.0-6.5	12.4	117.5	91	6
37/29	2.0-2.5	14.9	121.8	93	2
38/30	5.0-5.5	6.6	120.1	92	2
39/31	1.0-1.5	17.0	116.2	92	1
40/32	2.0-2.5	13.3	113.0	91	3

TABLE II (CONT.)

Test/Trench	Depth (ft.)	Moisture Content%	Unit Weight (pcf)	Relative Compaction%	Soil Type
41/33	1.0-1.5	12.1	117.8	93	1
42/34	4.0-4.5	17.8	113.8	94	9
43/35	3.0-3.5	17.2	113.5	93	9
44/36	2.0-2.5	13.2	111.3	91	8
45/37	3.0-3.5	12.8	121.5	93	2
46/38	1.0-1.5	12.3	114.0	93	5
47/39	3.0-3.5	9.9	110.5	91	9
48/40	1.0-1.5	16.0	107.4	90	4
49/40	3.0-3.5	7.5	108.5	91	4
50/41	3.0-3.5	18.1	113.5	93	9
51/41	8.0-8.5	13.7	122.7	94	2



1 OF 2	DRAWN: R.W.K. DATE: 10/21/97 CHECKED: DATE: REVISION #: DATE: JOB NO SP32898	TITLE: AS-BUILT DEMOLITION PLAN MCDONNELL DOUGLAS REALTY CO. 4060 LAKEWOOD BLVD., 6TH FLOOR LONG BEACH, CA 90808-1700 PROJECT: HARBOR GATEWAY HARBOR GATEWAY LOS ANGELES, CA	TAIT & ASSOCIATES INC.	1100 TOWN & COUNTRY ROAD SUITE 1200, P.O. Box 4429 Orange, California 92868 (714) 560-8200 (714) 560-8211 FAX	NO. DESCRIPTION BY DATE CHK REVISIONS NO. DESCRIPTION BY DATE CHK REVISIONS

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